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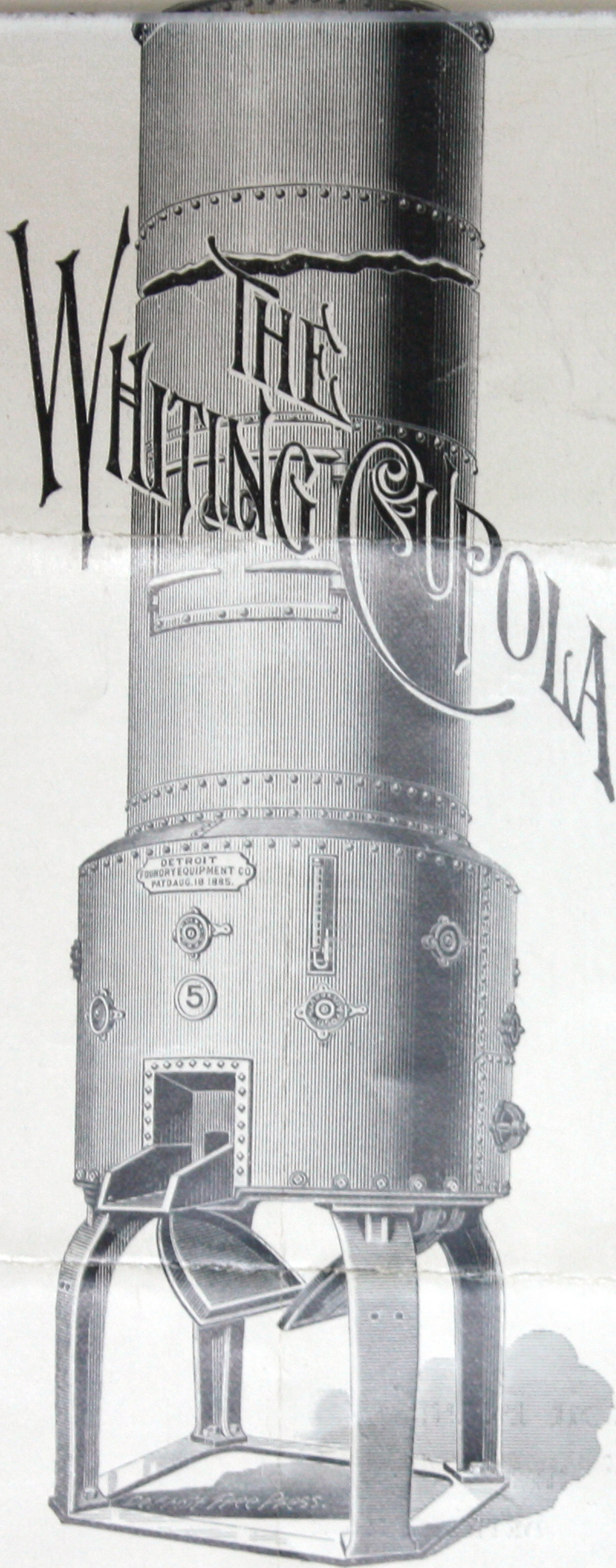
The Whiting Cupola.

Detroit Foundry
Equipment Co.

DETROIT, MICH.

CHICAGO OFFICE,
225 Dearborn St., Cor. Quincy.
Temple Court, Rooms 702 & 703.

NEW YORK OFFICE,
182 Front Street.



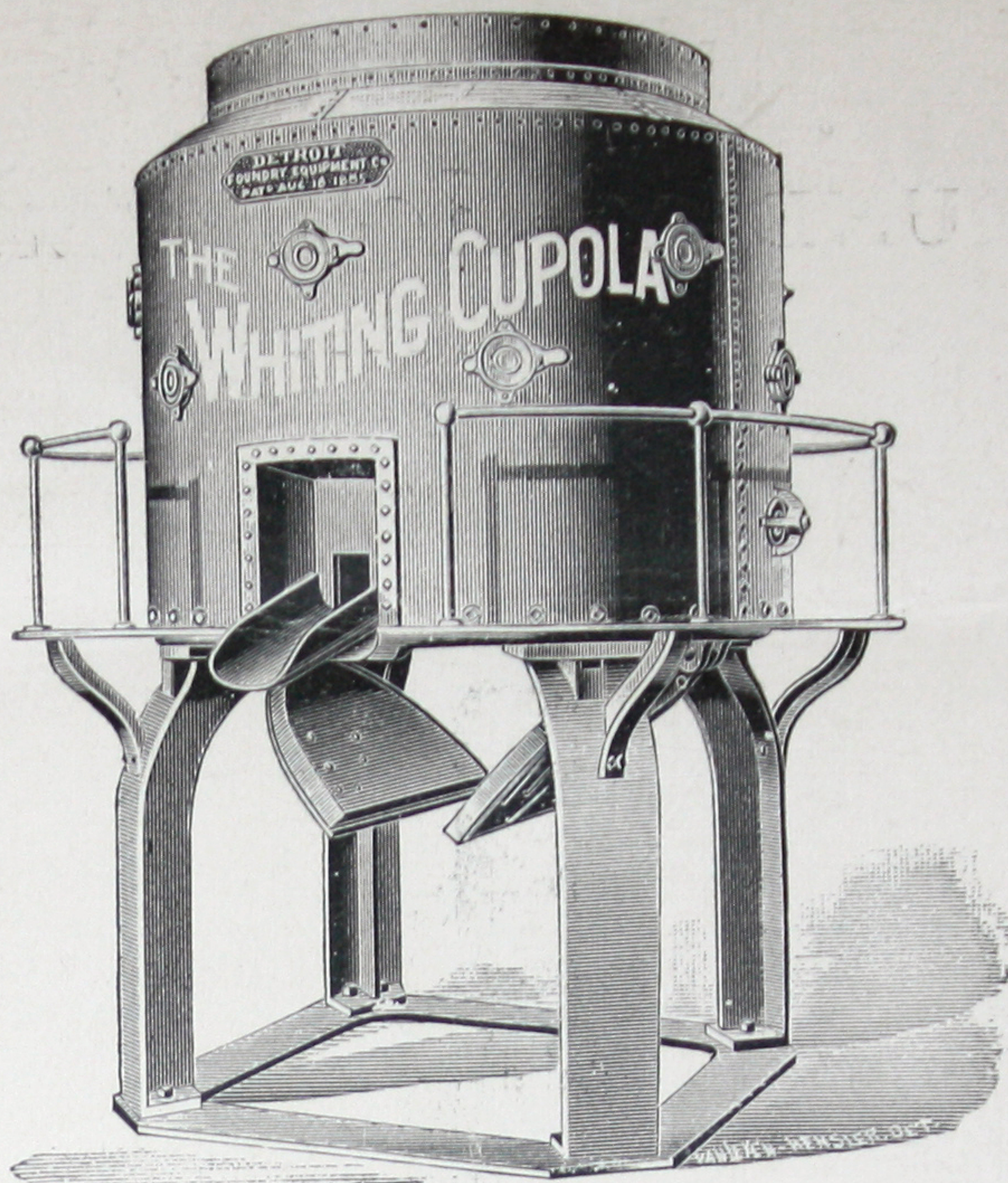
MADE IN TWELVE SIZES.

DETROIT FOUNDRY EQUIPMENT CO.
DETROIT, MICH.

DETROIT OFFICE AND WORKS,
MICH. AVE. AND D. & B. C. R. R. CROSSING.

NEW YORK, 182 FRONT STREET.

CHICAGO,
225 DEARBORN ST.



The Whiting Patent Cupola.

Why it is The Best.

It saves **fuel**.

It saves **time**.

It saves **lining**.

It melts **hot, fluid iron**, and melts it **rapidly** and **economically**.

It discharges the slag freely.

It melts **continuously** for an indefinite period.

It can be adapted to any grade of work, and will give the **best possible results** in each.

It saves **blast** by distributing a moderate pressure where it will be most efficient.

It saves **repairs**, because it is constructed for **service**, and is heavy and strong in every part.

It is **convenient** and simple in operation.

It is designed by practical foundrymen, who are acquainted with the needs of the business.

It is supplied at as low a price as is consistent with the workmanship and weight.

There are nine Whiting Patent Cupolas in operation in Detroit, and they are melting over 300 tons of iron per day.

DETROIT FOUNDRY EQUIPMENT COMPANY.

MANUFACTURING

Foundry Labor Saving Devices.



A Few Extracts from Letters. We will send copies
of complete Letters on application.

- "Your Cupolas have given us entire satisfaction."
- "We cannot recommend it highly enough."
- "It has fulfilled all claims."
- "We need hot, fluid iron, and have no trouble getting it with your Cupola."
- "The best we have ever used."
- "Your Cupolas have given the best of satisfaction, and we give them our endorsement."
- "We are well satisfied; the iron comes sharp, and keeps the men busy."
- "It fills the bill."
- "Melting over ten to one, and have very hot iron."
- "We are well pleased with it. It saves our coke bills and lining."
- "Melting over ten to one. Quality of castings excellent."
- "All you claim for it."
- "Satisfactory in every particular."
- "We would not be without it."

THE WHITING IMPROVED CAR WHEEL FOUNDRY
PLANT, IMPROVED STEAM, BELT, ELECTRIC
AND HAND POWER CRANES AND DERRICKS,
LADLES, TRUCKS, TUMBLERS, SAND
SIFTERS, ELEVATORS, ETC.

A Few of Many.

Names of Established Firms Using the Whiting Patent Cupola.

Covering Every Class of Work; Light; Heavy;
Stove Plate; Chilled Work, Etc.

Barnum & Richardson Manufacturing Co., Chicago.
Gould & Eberhardt, Newark, N. J.
Madison Car Co., Madison, Ill., (three).
Chicago Skein and Axle Co., Chicago, Ill.
Otis Bros. & Co., New York.
Western Electric Co., Chicago, (two).
Michigan Brass and Iron Works, Detroit.
Roanoke Machine Works, Roanoke, Va., (two.)

Michigan-Peninsular Car Co., Detroit, (six).
Janesville Machine Co., Janesville, Wis.
Hansel-Elcock Foundry Co., Chicago.
Buffalo Car Wheel Works, Buffalo, (two.)
L. M. Rouse & Co., Chicago.
Minnesota Iron Car Co., Duluth, (two.).
Appleton Manufacturing Co., Appleton, Wis., (two).
Russell & Co., Massillon, Ohio.
Scranton Stove Works, Scranton, Pa.

A. Bolter & Son, Chicago.
Tredegar Iron Works, Richmond, Va., (two).
Hamilton Foundry and Machine Works, Hamilton, O.
Weir & Craig, Chicago.
Michigan Radiator & Iron Manufacturing Co., Detroit.
Marinette Iron Works, West Superior.
Jackson & Woodin Manuf'g Co., Berwick, Pa., (three.)
Chas. J. Hodge, Houghton, Mich.
Fraser & Chalmers, Chicago, (two).
And many others.

There are over thirty Whiting Cupolas in operation in the city of
Chicago, and they are melting over 600 tons per day.

Numbers and Capacities.

The following table gives the numbers and capacities of the Whiting Cupola; we have added during the year three new sizes and now have twelve sizes to submit to our customers. It will be noticed that the diameter of shell used is ample to allow for the capacity given. In the Cupolas larger than No. 4 we recommend a nine inch or double brick lining, and the capacity is figured on that basis; if a thinner lining is used in these Cupolas the capacity will of course be increased above our figures.

We are prepared to name prices on the Cupola *body* alone, as illustrated on page II, or on Cupola complete with any required length of stack. We aim to *carry in stock* sufficient iron for each size of these Cupolas, thus saving the annoying delay of securing iron from the mills.

NUMBER OF CUPOLA	CAPACITY PER HOUR	DIAMETER OF SHELL	DIAMETER INSIDE OF LINING	DIAMETER OF AIR CHAMBER	LINING USED WITH CAPACITY HERE RATED
1	1/2 to 1 Ton	32 Ins.	23 Ins.	44 Ins.	4 1/2 Ins.
2	1 " 2 "	36 "	27 "	50 "	" "
2 1/2	1 " 5 "	41 "	27 to 32	57 "	4 1/2 or 7 Ins.
3	3 " 5 "	46 "	32 Ins.	62 "	7 Ins.
4	5 " 7 "	56 "	42 "	72 "	7 "
5	7 " 9 "	63 "	45 "	81 "	9 "
6	9 " 10 "	66 "	48 "	87 "	9 "
7	10 " 12 "	72 "	54 "	94 "	9 "
8	12 " 14 "	78 "	60 "	102 "	9 "
9	14 " 16 "	84 "	66 "	108 "	9 "
10	16 " 20 "	96 "	78 "	119 "	9 "
11	20 " 25 "	102 "	84 "	128 "	9 to 12 Ins.

Hints in Ordering.—In asking quotations give height of stack required.

Arrange to place charging door as high as possible; 12 to 16 ft. above bottom doors will give good results.

Order columns long enough to allow them to project six inches below ground level. The foundation may then be covered with earth and protected from the drop.

Always state what kind of work it is to be used for.

Always give kind of fuel you intend to use.

If you have not purchased a blower, consult with us as to size needed.

The Whiting Cupola.

THE Whiting Patent Cupola scarcely needs an extended introduction to the foundry trade. Although a comparatively new invention it has met with an immediate and extensive success. This is shown by the testimony of hundreds in daily use in this country in every class of work and every department of foundry practice. The sale of one is sure to guarantee more in the same locality.

The Cupola was originally designed as a fuel saver, and experience has proven it to be this and much more. It saves lining, repairs and time, and it gives improved quality of castings.

The public have not been slow to appreciate these features and the constantly increasing demand has necessitated a larger building and improved machinery comprising the most complete Cupola plant in the country.

Foundrymen are beginning to see the advantages of purchasing an improved Cupola embracing the features of convenience, economy and durability;—especially when it can be purchased with all attachments at a price about as low or lower than that of a “home made” Cupola.

NOTICE TO STOVE FOUNDERS.

In connection with the standard Whiting Cupola as designed for general work, we have this year placed upon the market a model embracing the continuous softened blast tuyere system and other distinctive features of the standard “Whiting,” but especially constructed for stove foundry practice. We unhesitatingly recommend it to Stove, Radiator and Malleable Iron Manufacturers as the most efficient Cupola for their purpose.

The Excellent Results.

The universal satisfaction given by the Whiting Cupola is largely due to the fact that it is designed upon principles that are universally conceded to

be correct in theory and have proven to be so in practice. These are partially embraced by the patent arrangement and construction of the tuyeres which so distribute the blast as to allow it to be most efficient and to reach those portions of the Cupola where it is most needed, and with a reduced pressure through an increased area.

There are two rows of tuyeres; the lower ones are arranged to form what is practically an annular air inlet, thus distributing the blast almost continuously around the inner circumference of the Cupola. These tuyeres are so arranged and constructed that the blast is admitted through a small area which is expanded into a large horizontal opening on the inside of the Cupola, thus allowing the blast to reach the iron through an area nearly double that through which it enters the tuyeres, and admitting the same volume of blast but softening its force.

There is an upper row of tuyeres of similar construction designed to furnish sufficient air to utilize to the fullest extent the escaping carbon gas.

Economy of Fuel.

It has been found from experience that the diffused blast arrangement embodied in this Cupola guarantees a large saving in fuel.

The proportion of iron melted to that of coke varies with the size of the Cupola, size of heat and the quantity of iron required. In a Whiting Cupola of average size with good heats the proportion of iron to coke is 10 to 1, in large heats we have often reached records of $12\frac{1}{2}$ to 1. We have an operating record for six months' melting of iron in a No. 7 Whiting Cupola in the foundry of the Detroit Car Wheel Co., showing a total of 13,416 tons melted, or an average proportion of 10 and 31-100 to 1. We have records of 20 Ton heats in a No. 5 Cupola showing $11\frac{1}{8}$ to 1, and records in 10 Ton heats in a No. 4 Cupola showing 10 to 1; these are average daily records producing good hot fluid iron, some of which was used for very light work, such as stove castings and light agricultural work.

The saving of fuel by using this Cupola, would in a very short time, pay for the entire cost, not to mention the many other advantages arising from its improved construction.

Hot Iron and Good Castings.

avoided. As a result, no trouble is experienced in getting castings sharp and fine and very even in quality. The diffused blast also results in a softer and better quality of iron to work. It is a well known fact that a sharp uneven blast often destroys the best qualities of iron. The iron comes out hot and fluid and runs very evenly in this respect throughout the heat.

Owing to the even distribution of the blast, the spotty uneven burning of the coke, complained of in Cupolas where air is admitted in certain spots only, is entirely

Saving in Lining.

The principle of distributing a soft blast evenly also tends to prevent the rapid destruction of lining; it is an established fact a sharp blast destroys the lining very rapidly and necessitates very frequently an entirely new lining, but experience has shown that a lining in the Whiting Cupola will outlast two in an ordinary Cupola.

The 13,416 Tons mentioned above was melted entirely without relining to Cupola. The Cupola does not require a special make or shape of lining brick, although we are prepared to quote prices on brick which is made of the proper shape to line any of the various sizes of the Cupola. These are large bricks about nine inches square on the inside, thus making few joints and making it somewhat easier to line up the Cupola. Any good quality of fire brick may, however, be used in this Cupola with satisfactory results.

Rapid Continuous Melting.

Quick melting is another feature arising from the peculiar construction of this Cupola; it has been found that in our larger Cupolas, our rated capacities per hour are rather under than over the actual capacity. One of our customers using a No. 6

Cupola, which is rated from 9 to 10 tons per hour, wrote us that they melted in forty-five minutes after the first hour of operation the rated capacity of 10 tons; in other words they melted at the rate of 12 to 13 tons after the first hour. Another has a No. 4, melting $8\frac{1}{2}$ tons per hour. Another writes us that his No. 8 is melting over 18 tons per hour. This, although unusual, proves that it is safe to take the capacity rated in our table. These capacities have been carefully figured out and confirmed by experience.

The Cupola melts continuously; a slag hole being used through which the melted slag is blown out, thus keeping the furnace from clogging up. We have records of our No. 8 Cupola melting continuously for ten hours before dropping bottom, and practically the same thing is being done in a No. 6 Cupola in this city and in various others throughout the country.

By the improved tuyere adjustment, slow melting may be accomplished when desired, by reducing the blast in the proper place.

Heavy Substantial Construction.

An effort has been made to make this Cupola substantial throughout and to make it one that will give good service rather than one to sell alone at a low price; it is much heavier than the Cupola usually built and it is so

designed that there is no waste material whatever, the portions which require the heaviest loads being proportioned accordingly; the bottom plate especially being made very heavy.

The supporting columns are curved in order to allow the bottom door to drop vertically and at the same time to bring the support directly under the weight of the iron and lining, thus preventing the bottom plate from cracking.

The shell is made extra heavy, especially that portion of it which is designed to support and enclose the charge; this heavy construction is more expensive at first but it is found much more durable and safe in the end, decreasing the risk and the amount of repairs constantly needed on a lighter constructed article.

The top of the air chamber is made of flange steel; this allows it to be properly caulked and made air tight, and also decreases the liability of breakage in shipment.

Special Features of Design.

Patent Tuyere System. The arrangement of these tuyeres has been fully described. They are independent of each other; of such a shape

that they will readily hold themselves in the lining, and will outlast any other tuyere made. This is the only tuyere that equalizes the distribution of the blast.

All Joints of Stack Open Downward on the Outside.

This is a new feature and has the advantage of shedding the water and keeping it out of the joints, preventing rust to the stack and damage to the lining from this cause.

Lining Supports of cast iron are placed inside the stack, these being of sufficient width and strength to support the brick lining above them. One shelf is placed immediately above the air chamber allowing that portion of the lining below to be repaired or replaced without removing the upper portion. Another shelf is placed just above the charging doors, and one shelf is provided for about every ten feet above this point.

Removable Side Plates, fitted with hand holes are provided on each side of the air chamber; these allow ready access to the interior of the air chamber in order that it may be properly cleaned out from time to time.

The Blast Pipe Nozzle is arranged to enter the air chamber on a line of a tangent, forcing the blast with a spiral or rotary motion around the shell, avoiding friction and resulting in a corresponding economy of power.

A Safety Tuyere is provided, having a soft metal attachment by which the operator can readily discover when the iron is too high in the Cupola.

A Blast Gauge of improved design, showing the air pressure at all times is provided with each Cupola; this gauge may be connected with the air chamber or with the blast pipe, and situated in any convenient place readily accessible to the operator.

Air Tight Peep Holes fitted with mica are placed opposite each tuyere; they are fitted with a hinge cover allowing them to be opened when necessary to clean out the tuyeres.

Eye Bolts are placed in the bottom of plate near the drop doors to support a bar forming the fulcrum of a lever, should one be used to raise the bottom doors.

Tuyere Gates. These are "shutting off" attachments to upper tuyeres, allowing any or all of them to be closed at will. They are of great value in regulating the speed of melting.

Every Cupola is provided with the above improvements, together with foundation plate, bottom plate and doors, columns (three to five feet long), slag and tapping spouts and frames, peep holes with fittings, patent tuyeres and charging doors and frames. All fitted ready to erect.

Unless otherwise stated our quotations cover all the above attachments.

EXTRAS.—In addition to the above we supply when required, at an additional cost, the following extra attachments:

Platforms with supporting brackets and railings and having a perforated cast iron floor. These are not usually required except on large Cupolas having high columns. They may be easily attached in the future.

Spark Arrester.—A conical bonnet or hood surmounting the stack, made of heavy iron, perforated and supported by iron standards. It has been found very useful in decreasing the fire risk.

Roof Hood.—A conical bonnet surrounding the Cupola just above the roof of the charging house, allowing the timbers of the roof to be removed a few inches from the stack and making a clear space around the stack, protecting this space, and acting at the same time as a ventilator to the charging room.

It may be attached to any Cupola.

Bottom Door Counter-balance.—On large Cupolas it is sometimes found convenient to equip the heavy bottom doors with a counter-balance to allow them to be easily raised. We can supply this when required at a slightly additional expense. All our large bottom doors are so designed that this may be attached in the future if needed.

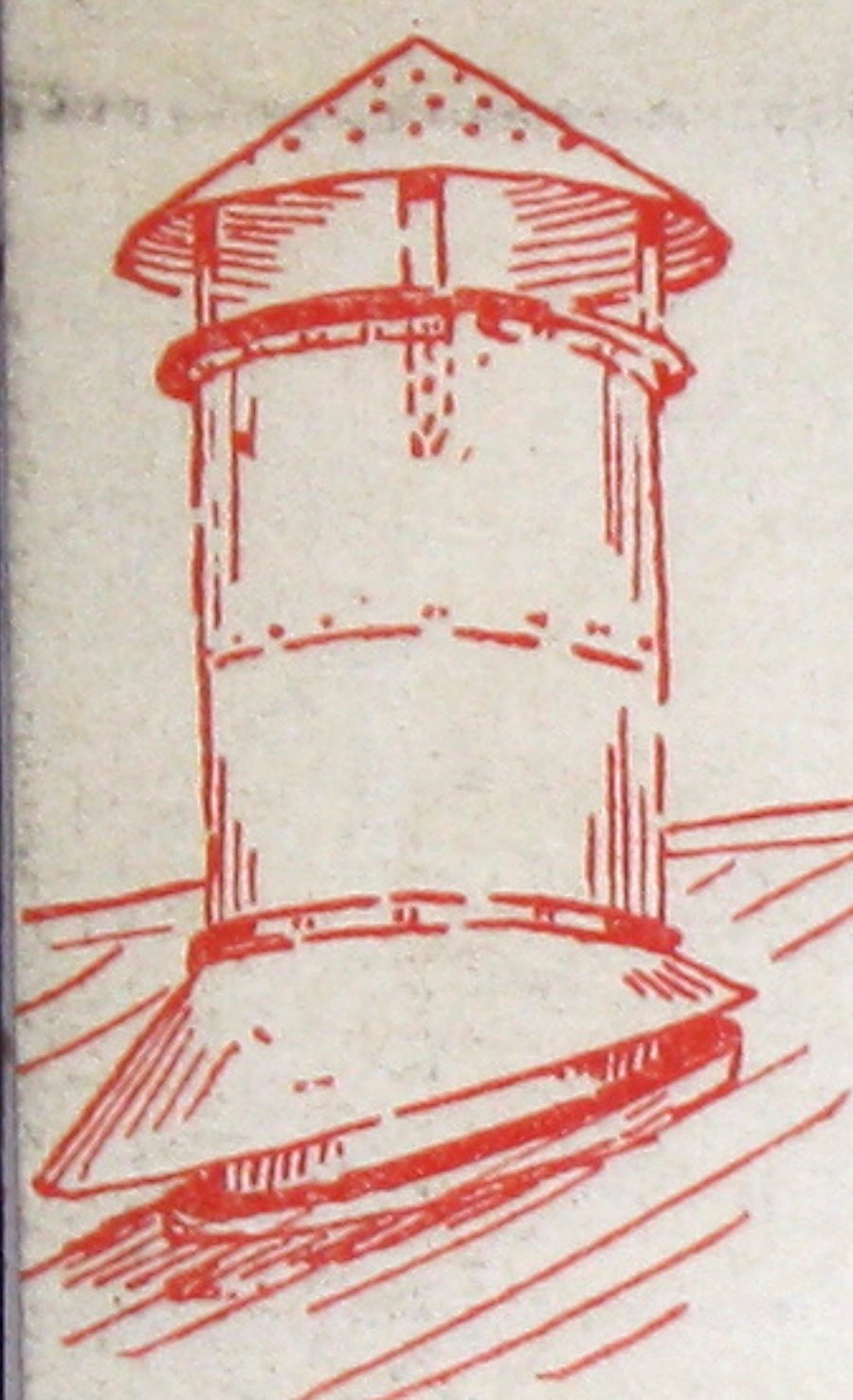
Tuyere Slides.—These may be attached to any Cupola, allowing the tuyeres to be placed at a height suitable for the fuel that is to be used, should the operator desire such an adjustment at any time.

Blast Gates.—Improved designs, suitable for any size of pipe.

Practical Hints.

A printed circular entitled "Practical Hints on the Operation of the Whiting Cupola," is supplied free to every purchaser. It contains practical information for erecting, charging and operating the Cupola. Although the construction and operation is very simple, we have found it well to start the purchaser out with a little of our experience; it often saves expensive experimenting. When requested we furnish men to superintend the erection and operation of the Cupola, at a reasonable price; the simplicity of the construction and operation usually makes this unnecessary.

We supply a drawing free, showing the size of foundation plate, etc., which allows the customer to build his foundation properly while the Cupola is being constructed.



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